HEART OF TEXAS COOPERATIVE OBSERVER

Winter Wonderland

A note from the Editor

I am new to the job of Observing Program Leader, but, not the Weather Forecast Office in San Angelo. I have been in this office for close to 17 years. Most of you have been dealing with me for many years now. This newsletter will be called the Winter Wonderland Issue. I have been very busy upgrading the Ficsher and Porter raingages, learning the job, working shifts and learning how to write a newsletter. I look forward to my new job and continuing to work with all of the COOP observers.

Eva Mullen
Observing Program Leader
WFO San Angelo, Texas

Gains and Losses

Due to budget cuts there have been no gains into the program. That will change soon. There have been several losses over this past year. We first lost Joan Cantrell at Robert Lee, retired after 2 years of service. Doris Brandt at Oak Creek Lake became ill after only one year with us, and Jessie Stinnett at Anson 3ESE retired after 3 years. There was Ruth Fairall at Eldorado 10W, whose husband passed away, and she moved after about 9 years. Lastly, Roy O. Rice at Winters left after 43 years. We are sorry for our losses, and hopefully we will be able to replace them this year.

LENGTH OF SERVICE AWARDS

Mrs. Dolores McCabe Seal of Water Valley, Texas received her 40 year Length Service Award from Eva Mullen, Operational Program Leader at WFO San Angelo, Texas.

Photo was taken by her Husband, Rachel Seal.

Mr. Rex Ford of Stamford, TX received his 15 year Length of Service Award from Joel Dunn a Meteorologist Intern at WFO San Angelo Texas.

Taking the photo was Eva Mullen, Operational Program Leader at WFO San Angelo, Texas

LENGTH OF SERVICE AWARDS

Mr. Charles (Bucky) Duvall
of Glen Cove, Texas
received his 10 year Service
award from Eva Mullen,
Operational Program Leader
at WFO San Angelo, Texas.

Photo was taken by his wife,
Judy Duvall.

Mrs. Lovera Strickland
of Burkett, Texas
received her 10 year Length
of Service Award.

Presenting the award and
taking the photo was
Eva Mullen, Operational
Program Leader at
WFO San Angelo, Texas

THE HISTORY OF VOLUNTEER WEATHER OBSERVERS

By Eva Mullen

The earliest known weather observations were recorded without instruments in the mid 1600s. In the 1700's, some well known observers were George Washington, Thomas Jefferson and Benjamin Franklin. Thomas Jefferson envisioned a nationwide network of weather observers as early as 1797 and set up the first circle of observers in every county in Virginia. By the early 1800s, the National Network of Weather Observations encompassed six states, and was the responsibility of the Surgeon General, Dr. James Tilton. At that time they used weather observations to research the influences of weather and climate on diseases.

The Smithsonian Institute took control of the Volunteer Weather Program in the mid 1800s. President Ulysses S. Grant signed into law the creation of The Division of Telegrams and Reports for the Benefit of Commerce in 1870. This was the precursor to the Weather Bureau and was under the direction of the Signal Service.

A new Weather Agency was created in October 1890, and was given charge of the Volunteer Weather Program, along with weather forecasting, issuing warnings, and displaying flood signals for the benefit of agriculture, commerce and navigation. The new agency was also in charge of gauging rivers, keeping telegraph lines along seacoasts operating, and reporting temperature and rainfall for cotton interests.

Today, there are nearly 11,000 volunteers across the United States that record weather observations. These observers conscientiously give of themselves and their time to record temperature and measure rainfall. This information defines the climate in their areas. It also answers questions and guides the actions of public agencies, agriculture, commercial organizations and individuals. It is used for preparedness in emergencies such as flooding. Without these volunteers, we couldn't begin to know the details of the United States climate or research global change.

There are no words to describe the value of weather observations that are taken and transmitted on a daily basis. Today's commerce, agriculture, weather forecasts and much more are dependant on your reports. So, to the cooperative observers that give a few minutes of their time each day to record and transmit a weather observation, your community and nation thank you.

Reminder to Rainfall Network Sites

Please remember that rainfall you report to the weather office must be for the 24 hour period ending at your observation time. Your observation time should be sometime between 7 am and 9 am each day. Reports must be received by this office no later that 9 am if your report is to get into the national database.

Wind Chill

By Joel Dunn, Meteorologist Intern

Wind Chill makes an appearance every year about this time. We see temperatures continue to drop and as we all know, windy conditions can happen anytime in West Central Texas. It's these two factors, temperature and wind speed, that make up Wind Chill.

For inanimate objects wind chill only serves to bring the object to the ambient temperature faster than it would without wind. The object will not, however, cool below the ambient temperature. For example, if the temperature is 35°F and the wind speed is 35 mph, then the calculated Wind Chill will be 21°F. Assuming they are dry, your pipes, car, sidewalk, etc. will cool very quickly to 35°F but no further, even though the wind chill is 21°F.

On the other hand, biological organisms, such as you and me, react differently to Wind Chill. As the wind blows across your skin it is attempting to drop the surface temperature of your skin to the surrounding temperature just like the inanimate object. However, your body responds to this and reacts by warming your skin, when this happens in an environment with cold temperatures and high wind speeds it can feel much colder than it really is, because wind causes your body to lose heat faster.

It is important to note that current wind chill and forecasted wind chill is a very serious factor to remember when venturing out. If we don't take time to check the weather forecast, wind chill could sneak up on us with results worse than most people would anticipate. Frostnip or frostbite can result from wind chill if care is not taken. This happens when temperature is 32 degrees or less, wind chill temperature is lower, and skin is left exposed for long periods of time. If you must venture out on blustery winter days, remember to dress for the conditions. Several layers of loose clothing with little or no exposed skin works best.

NWS Windchill Chart

Wind (mph) \ Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Winter Weather Outlook for West Central Texas

By Hector Guerrero

Recent Drought and Rainfall Trends in West Central Texas

An active southern stream weather pattern brought periodic rainfall and even snowfall to West Central Texas over the past 2 months. The yellow colors below in Figure 1. shows the region that experienced below normal precipitation, while the gray areas indicated the region that received near to above normal precipitation for the past 90 days.

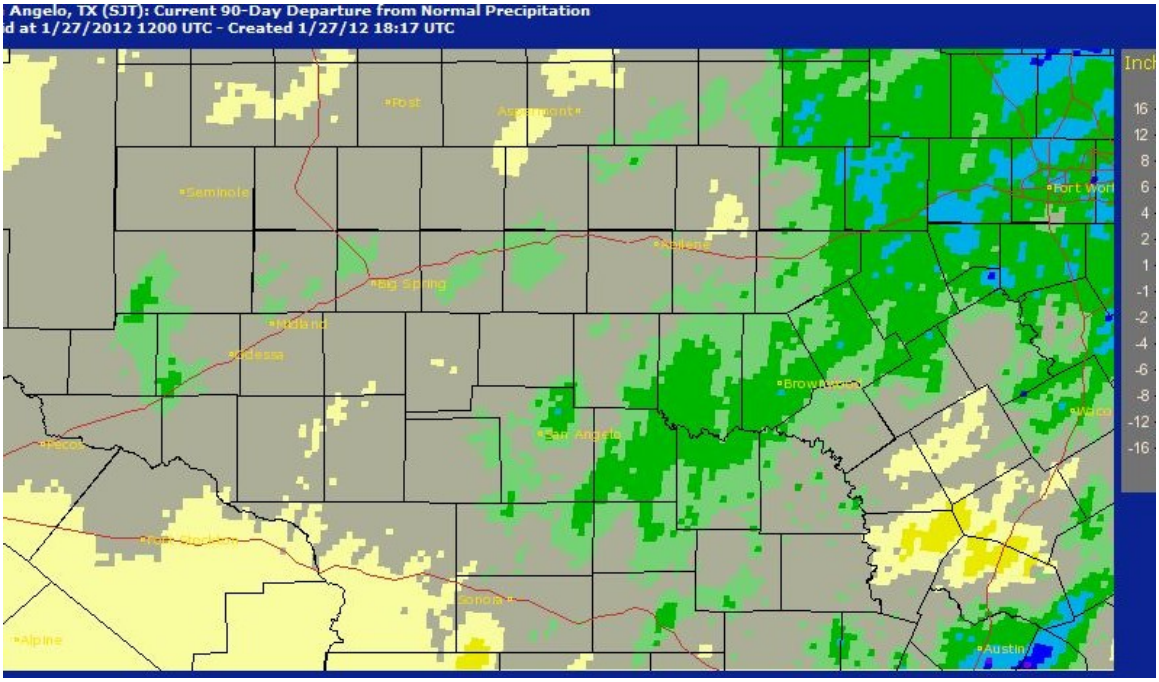

Figure 1: Rainfall departure from normal for the past 90 days, ending January 27, 2012.

The latest U.S. Drought Monitor for Texas (Figure 2), issued through the National Drought Mitigation Center on December 13, showed somewhat of an improvement across the parts of Texas. In West Central Texas, drought conditions in a relative sense improved slightly, from the exceptional to the severe and extreme categories, from the eastern and southern parts of the Big Country southward across the Concho Valley and into Central Texas.

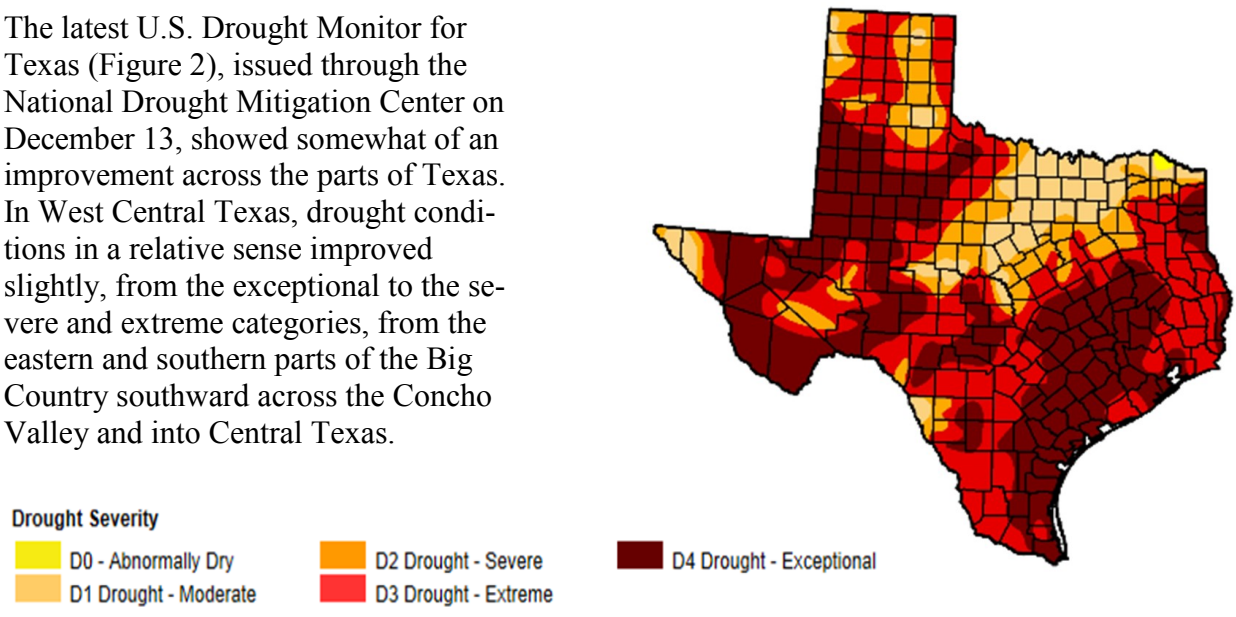

Figure 2 . U.S. Drought Monitor for Texas (December 13th)

Status with the Climate System

La Nina conditions redeveloped at the beginning of this fall season and it is expected to continue into March before beginning to gradually weaken by April. La Nina is associated with a periodic cooling of the waters in the equatorial part of the Pacific Ocean. La Nina conditions were present during the last winter season, and continued into the spring of this year. A noteworthy item about recurring La Nina events can be seen from the historical record. The record for La Nina (and El Nino) events, dating back to 1950, shows that "back to back" occurrences of La Nina are not uncommon. The last such occurrence was with the La Nina episode which began in 1998 and ended in 2000, spanning two consecutive winter seasons.

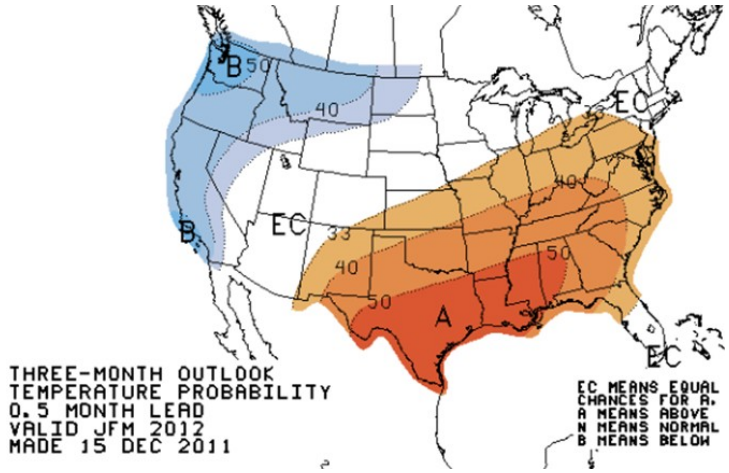

Figure 3. Climate Prediction Center Outlook for Temperature, January—March.

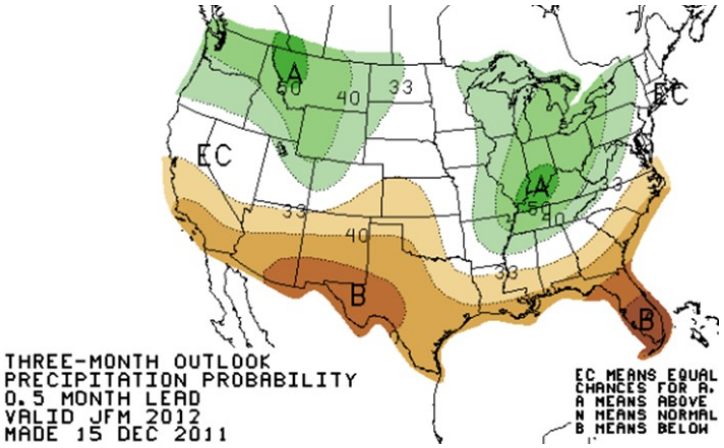

Figure 4. Climate Prediction Center Outlook for precipitation, January—March .

La Nina and its Importance

La Nina (and El Nino) conditions are the best understood, in terms of their long-term impacts on weather patterns worldwide. Their developments have far-reaching effects on global circulation patterns which, in turn affects the position and strength of jet streams. This has an important influence on the strength and track of storm systems.

Over the years, specific weather patterns have been observed, in association with La Nina (and El Nino) conditions, especially for the stronger events. This has led to a better understanding of their effects on a large scale. Their effects can be accounted for in the long-range outlooks.

The effects of La Nina typically start to become more noticeable in November, and usually have the greatest influence during the winter season months of December through February. The effects can linger into the spring season.

Climate Outlook for January through March (2012)

The Climate Prediction Center (CPC) indicates that La Nina conditions will continue through the upcoming winter season of 2011-2012. From recently observed trends and climate model forecasts, a weak to moderate La Nina event is anticipated.

The Climate Prediction Center temperature outlooks for January through March (Figure 3), indicates an enhanced probability for temperatures to average above normal across West Central Texas. The CPC precipitation outlooks for January through March (Figure 4), shows an enhanced probability for precipitation to be below normal, for all of West Central Texas.

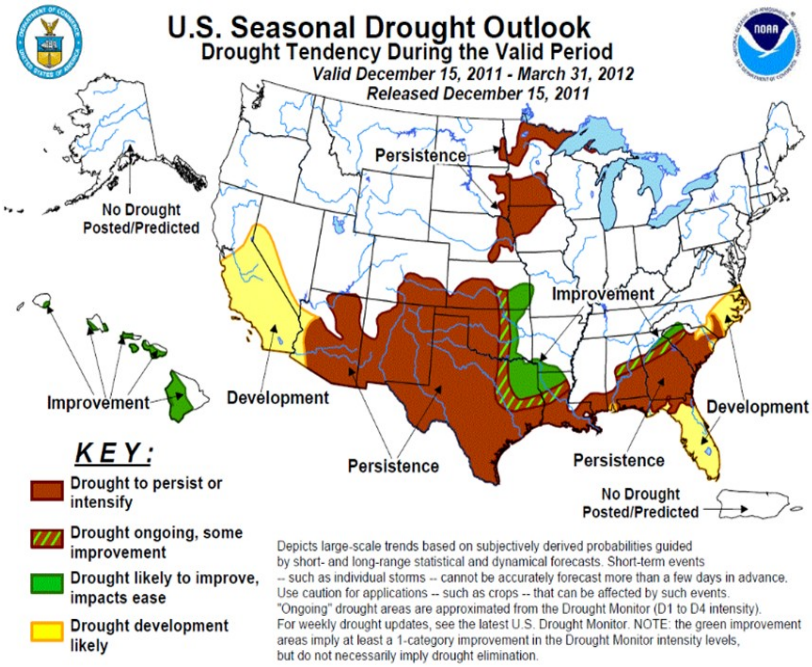

Figure 5. U.S. Seasonal Drought Outlook.

The results of local precipitation studies show that, for moderate to strong La Nina events, average winter season precipitation is below normal at stations across West Central Texas. This is consistent with what is indicated in the Outlooks from the Climate Prediction Center.

In Figure 5 below, the most recent U.S. Seasonal Drought Outlook, issued by the Climate Prediction Center on December 15, indicates that drought conditions will most likely persist across all of Texas, during the January-March time period. With La Nina in place, it is unlikely that our region will receive enough rainfall to alleviate the ongoing drought.

Implications with Patterns Influenced by La Nina

When weak to moderate La Nina events occur, the effects can influence regional weather patterns which can help to bring about the following in West-Central Texas:

Worsening of ongoing drought conditions.

Increased fire weather concerns, as grasses become cured and vegetation becomes dormant. An unfavorable track of storm systems can result in extended periods with lack of rainfall, and where repeat weather events occur with strong, gusty winds which are accompanied by intrusions of warm and very dry air into our region.

Other Considerations

Even though there are pattern similarities with La Nina, there are unique characteristics with each new season, and no two events are exactly alike. Even when a La Nina pattern prevails overall in a winter season, certain patterns can develop which bring temporary intrusions of very cold air, or temporary wet weather periods. An example of this type of temporary pattern disruption has been with the recent precipitation trends this December. Although La Nina conditions were present, the development of a northern and southern stream storm track or a "split flow" pattern has brought beneficial rainfall to the region. The northern stream has dislodged cold air masses into Texas while the southern stream generated potent Pacific upper level disturbances that have traversed the region. The combination of these systems has resulted in beneficial precipitation across West Central Texas.

Concluding Remarks

The NOAA Climate Prediction Center indicates that the La Nina conditions will strengthen and will continue through the upcoming winter season. The Outlooks January-April show enhanced probabilities for precipitation to be below normal, and for temperatures to average above normal, across all of West Central Texas. The U.S. Seasonal Drought Outlook from CPC indicates that drought conditions will most likely persist for all of Texas through April.

West Central Texas Rainfall Totals for 2011

By Jason Johnson, Hydrologist

Much of the area endured extremely dry conditions in 2011. Rainfall data collected throughout the year by west central Texas Cooperative Observers is summarized in Figure 6. The data collected from January through November depicted total rainfall amounts ranging from 4.65 inches in Sterling County to about 15.60 inches in San Saba County. The following is a monthly breakdown of the precipitation amounts reported by National Weather Service Cooperative Observers.

The average precipitation reported from coop observers in January was 0.59 of an inch. The highest monthly precipitation total of 2.25 inches was reported in eastern San Saba County. Only the Coop observers in San Saba County received over 1.5 inches of precipitation in January.

The average precipitation reported from coop observers in February was 0.68 of an inch. The highest monthly precipitation total of 2.36 inches was reported in Taylor County. Of this amount, over one inch actually fell during the evening of January 31. Coop observers in Callahan and Taylor Counties received over two inches of precipitation that was recorded in the February coop reporting period.

During March, the average precipitation reported from coop observers was 0.14 of an inch. The highest monthly precipitation total of 0.75 of an inch was reported in Runnels County. Coop observers in Nolan, Coke and Runnels Counties received over half an inch of precipitation.

April was another drier than normal month as the average precipitation reported from coop observers was 0.64 of an inch. The highest monthly precipitation total of 1.67 inches was reported in Menard County. Coop observers in Coleman, Menard and Taylor Counties received over 1.5 inches of rainfall in April.

In May, the average rainfall amount reported was 1.04 inches. The highest monthly amount was reported from Brown County at 5.08 inches. Coop observers in Coleman and Brown Counties received over three inches of rain.

The average rainfall reported from coop observers in June was 0.60 of an inch. The highest monthly precipitation total of 2.29 inches was reported in eastern Coleman County. Coop observers in northern Concho and eastern Coleman Counties received over two inches of rain in June.

The dryness continued as the average rainfall reported from coop observers in July was 0.11 of an inch. The highest monthly rainfall total of 0.68 of an inch was reported in Mason County.

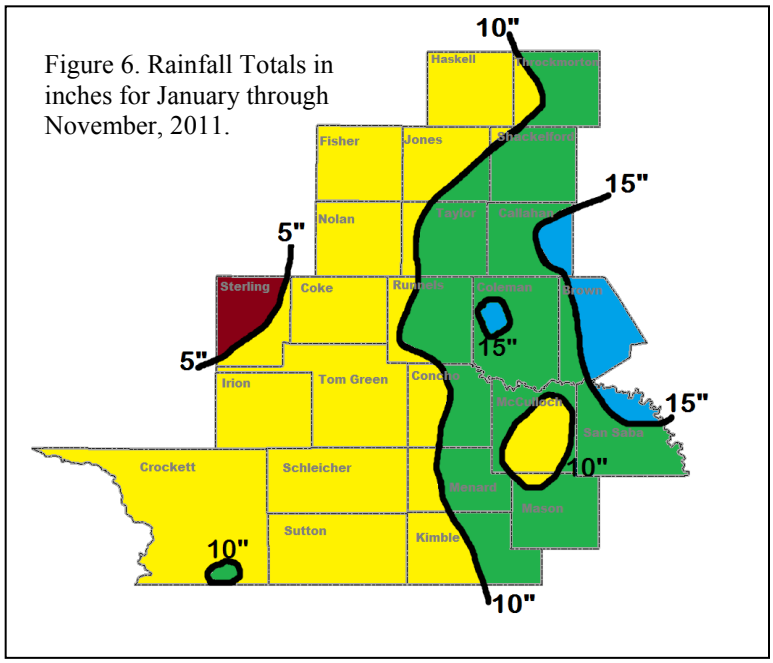

Figure 6. Rainfall Totals in inches for January through November, 2011.

The average rainfall reported from coop observers in August was 1.07 inches. The highest monthly rainfall total of four inches was reported in northern Shackelford County. Coop observers in Shackelford, Taylor and Tom Green Counties received over three inches of rain in August.

In September, the average rainfall amount reported from coop observers was 0.63 of an inch. The highest monthly precipitation total of 2.85 inches was reported in Crockett County. Coop observers in Menard and Crockett Counties received over two inches of rain in September.

The average precipitation reported from coop observers in October was 3.75 inches. The highest monthly precipitation total of 6.26 inches was reported in eastern Callahan County. Coop observers in Brown, Callahan, Crockett, San Saba and Throckmorton Counties received over five inches of rain in October.

The average precipitation reported from coop observers in November was 0.57 of an inch. The highest monthly total of 2.01 inches was reported in Throckmorton County. Coop observers in Brown and Throckmorton Counties received over one inch of rain in November.

5 Significant Weather Events Across West Central Texas in 2011

By Hector Guerrero

…The Five Most Significant Weather Events for 2011...

Weather across West Central Texas can change dramatically and is typically characterized by flash floods, drought, wildfires, hail, winter storms and tornadoes. 2011 will go down as **the hottest summer on record**. Below are five of the most significant weather events for 2011 that impacted the region.

Location/Storm Event	Date	Fatalities
1. Drought, Wildfires and Heat in West Central Texas	**2011**	**None**
2. Powerful Winter Storm and Cold in Abilene and Big Country	**Feb 1-4**	**None**
3. Abilene Hail Storm	**April 24**	**None**
3. Clyde Downburst	**May 1**	**None**
5. San Angelo Flash Flood	**August 13**	**None**

A Detailed Summary of the Top 5 Extreme Weather Events in 2011

1) Drought

The historic drought that began on October of 2010, continued into the winter of 2011. However, recent fall rains and cooler weather have provided some relief. The U.S. Drought Monitor, issued through the National Drought Mitigation Center recently depicted exceptional drought over much of West Central Texas with some improvement to a moderate to severe drought in an area from the Dallas/Fort Worth Metroplex extending southwest to San Angelo. The rest of West Central Texas to the west and south was either in an extreme or an exceptional drought.

The latest November Texas Crop Weather report from Texas A&M indicated the cotton harvest neared completion; only irrigated fields were being harvested. Growers were almost finished planting small grains. Some earlier planted fields were up and being grazed. Winter wheat was in poor condition due to low soil moisture. Rangeland and pasture conditions continued to decline. Hay was in short supply, and no grazing was available in many areas. Livestock producers further increased supplemental feeding of cattle.

1) Wildfires

Numerous wildfires burned hundreds of thousands of acres across a large part of drought stricken West Central Texas from January through September 2011 that tested every firefighter and first responder in West Central Texas. The Texas Forest Service reported that Coke County experienced 15 to 30 percent of total land burned. The Wildcat Fire, one of the largest wildfires, impacted Coke and Tom Green Counties. This fire encroached on the northern fringes of San Angelo before the winds shifted to the south then east. Thanks to our fire fighters, no lives were lost and many buildings were saved from the Wildcat Fire and other wildfires that threatened the region. We are also thankful for the fall rains that gave the region a reprieve from the wildfires.

1) The Hottest Summer and the Driest Period on Record

San Angelo had one hundred days with high temperatures of 100 degrees or more which shattered the previous records dating back to 1907 (there were sporadic missing data before 1947). Abilene reported eighty-one days with high temperatures of 100 degrees or more and this also shattered the previous records dating back to 1886.

Ranking of Record Average Monthly Temperatures for San Angelo, dating back to 1907 with sporadic missing data before 1947.

1	89.7	August 2011
2	89.6	July 2011
3	88.6	June 2011
4	88.2	August 1952
5	88.0	August 1943

Ranking of Record Average Monthly Temperatures for Abilene, dating back to 1886.

1	90.3	August 2011
2	90.1	July 2011
3	90.0	August 1952
4	89.9	August 1943
5	89.4	July 1980

From October 1 of 2010 through September 30 of 2011, the Texas state climatologist stated "this was **the driest periods on record** for the **entire state of Texas**." See how Abilene and San Angelo compared in the table below.

Abilene (since 1886), San Angelo (since 1908 with a few years of missing data) and Junction observed total and normal rainfall from October 1, 2010 through September 30, 2011 and 2011 Year to Date.

Dates and Rainfall Data	Abilene Airport (in.)	San Angelo Air-port (in.)	Junction Air-port (in.)
10/1/10 to 09/30/2011 Observed Total Rainfall	**13.50 (6th driest)**	**8.50 (5th driest)**	**5.25**
10/1/10 to 09/30/2011 Normal Rainfall	24.82	21.25	22.46
01/1/11 to 12/21/2011 Observed Total Rainfall	**16.67 (19th driest)***	**9.12 (5th driest)***	**11.01**
01/1/11 to 12/31/2011 Normal Rainfall	24.36	20.89	24.53

*With precipitation in the forecast, both San Angelo and Abilene could move into 6th and 20th place, respectively, by the end of 2011. The 20th driest year on record for Abilene was 17.57 inches in 1891; for San Angelo, the 6th driest year was 9.88 inches in 1954. The driest year ever for San Angelo was 7.41 inches in 1956; for Abilene the driest year was 9.78 inches in 1956. An updated total will be provided by the end of 2011.

2) A Powerful Winter Storm Shut Down the Big Country

In the beginning of February a deepening surface low, a frigid arctic front, and a digging upper level jet stream interacted with Gulf moisture to produce a variety of winter weather like thunder snow, thunder sleet, freezing rain, pea size hail, and locally heavy rainfall across a large part of West Central Texas.

This winter storm resulted in power outages and numerous school closings across the Big Country (schools were closed for several days in Abilene and many surrounding areas). Icy roads were very hazardous for several days and made it difficult for travel from February 1 to February 4th. High winds also produced near whiteout conditions during the early morning hours of February 1. A bitterly cold arctic air mass kept temperatures below freezing for almost four days. On one of those nights, the temperature dipped into the single digits across Abilene and the Big Country. This prolonged frigid air caused many broken water pipes across the region.

3) Abilene Hail Storm

A supercell thunderstorm produced Grapefruit size hail across the southern half of Abilene on April 25 and damaged or destroyed vehicle windshields and roofs of many homes and businesses.

3) Clyde Downburst

A National Weather Service Survey found widespread significant wind damage in Callahan County and, specifically in the community of Clyde on May 1st. Wind speeds (estimated from damage) were likely to have been around 90 mph. These winds destroyed one manufactured home, and moved a nearby one slightly from its original location. A person living in the destroyed home was only slightly injured. Strong winds also uprooted numerous trees and roofs. A couple of other mobile homes were also moved and sustained roof damage. The downburst winds (strong descending winds from aloft that strike the ground, then spread out horizontally causing strong damaging winds) damaged approximately an 8 to 10 square mile area which included Clyde and areas to the southwest, north and east of town.

5) San Angelo Flash Flood

An outflow boundary from a complex of thunderstorms across North Texas produced heavy rain as it moved south across the Big Country during the night time on August 12. During the morning hours on August 13, the outflow boundary stalled over San Angelo. As a weaker boundary from the south collided with the stalled boundary in a very moist atmosphere, extremely heavy rainfall of 3 to 8 inches fell across the City of San Angelo and resulted in flash flooding.

Several vehicles were stranded or swept away at low water crossings. Fortunately, no one was killed. It was an extremely welcome rainfall, but it just fell too quickly. Hence, for a few hours many roads and low water crossings became impassible.